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**IN THE CLAIMS**

1. (currently amended) An interleaving method comprising the steps of:

storing data to be transmitted in a storing unit;

arranging outputting said stored data by a control unit, said outputted data to be transmitted arranged in a matrix; and

rearranging said data by said control unit, said data being rearranged by interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and by interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data; and

outputting said rearranged data in time series.

2. (currently amended) A de-interleaving method comprising the steps of:

receiving interleaved data;

storing said received data in a storing unit;

arranging outputting said stored data by a control unit, said outputted received data having been interleaved in a matrix; and

rearranging said outputted data by said control unit, said outputted data being rearranged by interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and by interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data; and

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outputting said rearranged data in time series, ~~thereby outputting said received data in the order before said received data was interleaved.~~

**3. (previously amended)** An interleaving apparatus for interleaving data to be transmitted, comprising:

a storing unit for storing data to be transmitted; and

a control unit for controlling said storing unit so that said data to be transmitted is outputted from said storing unit with said data to be transmitted arranged in a matrix and said data to be transmitted rearranged by interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and by interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data.

**4. (previously amended)** The interleaving apparatus according to claim 3, wherein said control unit comprises a write control unit for generating a write address to be used to write said data to be transmitted in said storing unit with said data to be transmitted arranged in a matrix and rearranged by interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and by interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data, and for writing said data to be transmitted in said storing unit, and said control unit reads said data to be transmitted stored in said storing unit in the order of addresses.

**5. (previously amended)** The interleaving apparatus according to claim 4,

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wherein said write control unit comprises a column number generating unit for randomly generating column numbers and a row number generating unit for randomly generating row numbers, and said write control unit writes said data to be transmitted in said storing unit with numbers generated by said column number generating unit and said row number generating unit as said write address to write said data to be transmitted in said storing unit.

**6. (original)** The interleaving apparatus according to claim 5, wherein each of said column number generating unit and said row number generating unit is configured with a memory for holding numbers used as addresses in a predetermined order.

**7. (previously amended)** The interleaving apparatus according to claim 3, wherein said control unit writes said data to be transmitted in said storing unit in the order of addresses, and said control unit comprises a read control unit for generating a read address to be used to read said data to be transmitted from said storing unit with said data to be transmitted stored in said storing unit arranged in a matrix and rearranged by interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and by interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data to read said data to be transmitted.

**8. (previously amended)** The interleaving apparatus according to claim 7, wherein said read control unit comprises a column number generating unit for randomly generating column numbers and a row number generating unit for randomly generating

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row numbers, and said read control unit reads said data to be transmitted from said storing unit with numbers generated by said column number generating unit and said row number generating unit as said read address.

**9. (original)** The interleaving apparatus according to claim 8, wherein each of said column number generating unit and said row number generating unit is configured with a memory for holding numbers used as addresses in a predetermined order.

**10. (previously amended)** A de-interleaving apparatus for de-interleaving received data, comprising:

a storing unit for storing said received data; and

a control unit for controlling said storing unit so that said received data is outputted from said storing unit in a state before said received data was interleaved by arranging said received data in a matrix and rearranging said received data by interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and by interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data.

**11. (previously amended)** The de-interleaving apparatus according to claim 10, wherein said control unit comprises a write control unit for generating a write address to be used to write said received data in said storing unit in a state before said received data was interleaved by arranging said received data in a matrix and rearranging said received data by interchanging rows of the matrix according to a predetermined order, each row

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representing a set of data pieces of said data, and by interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data, to write said received data, and said control unit reads said received data stored in said storing unit in the order of addresses.

**12. (previously amended)** The de-interleaving apparatus according to claim 11, wherein said write control unit comprises a column number generating unit for randomly generating column numbers and a row number generating unit for randomly generating row numbers, and said write control unit writes said data in said storing unit with numbers generated by said column number generating unit and said row number generating unit as a write address.

**13. (original)** The de-interleaving apparatus according to claim 12, wherein each of said column number generating unit and said row number generating unit is configured with a memory for holding numbers used as addresses in a predetermined order.

**14. (previously amended)** The de-interleaving apparatus according to claim 10, wherein said control unit writes said received data in said storing unit in the order of addresses, and said control unit has a read control unit for generating a read address to be used to read said received data in a state before said received data was interleaved from said storing unit by arranging said received data stored in said storing unit in a matrix and rearranging said received data by interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and by interchanging columns of the matrix according to a predetermined order, each column

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representing a set of data pieces of said data, and for reading said received data from said storing unit.

**15. (previously amended)** The de-interleaving apparatus according to claim 14, wherein said read control unit comprises a column number generating unit for randomly generating column numbers and a row number generating unit for randomly generating row numbers, and said read control unit reads said received data from said storing unit with numbers generated by said column number generating unit and said row number generating unit as a read address.

**16. (original)** The de-interleaving apparatus according to claim 15, wherein each of said column number generating unit and said row number generating unit is configured with a memory for holding numbers used as addresses in a predetermined order.

**17. (previously amended)** An interleaving/de-interleaving system comprising an interleaving apparatus for interleaving data to be transmitted and a de-interleaving apparatus for receiving said transmitted data interleaved by said interleaving apparatus to de-interleave said transmitted data, wherein said interleaving apparatus outputs said data to be transmitted with said data to be transmitted arranged in a matrix and rearranged by interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and by interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data, and said de-interleaving apparatus outputs received data in a state before said transmitted data was interleaved by arranging said received data in a matrix and

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rearranging said received data by interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and by interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data.

**18. (previously amended)** An interleaving/de-interleaving apparatus for transmitting/receiving interleaved data to/from an opposite interleaving/de-interleaving apparatus, comprising:

an interleaving apparatus for outputting data to be transmitted to said opposite interleaving/de-interleaving apparatus with said data to be transmitted arranged in a matrix, and said data to be transmitted rearranged by interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and by interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data; and

a de-interleaving apparatus for outputting received data interleaved in said opposite interleaving/de-interleaving apparatus in a state before said received data was interleaved by arranging said received data in a matrix, and rearranging said received data by interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and by interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data.

**19. (previously amended)** An interleaving apparatus for interleaving data to be transmitted, comprising:

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a storing unit for storing data to be transmitted;

a control unit for controlling said storing unit so that said data to be transmitted is outputted from said storing unit with said data to be transmitted arranged in a matrix and rearranged by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data; and

wherein said control unit comprises a write control unit for generating a write address to be used to write said data to be transmitted in said storing unit with said data to be transmitted arranged in a matrix and rearranged by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data, and for writing said data to be transmitted in said storing unit, and said control unit reads said data to be transmitted stored in said storing unit according to the order of addresses of said storing unit.

**20. (previously amended)** An interleaving apparatus for interleaving data to be transmitted, comprising:

a storing unit for storing data to be transmitted;

a control unit for controlling said storing unit so that said data to be transmitted is outputted from said storing unit with said data to be transmitted arranged in a matrix and rearranged by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and



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interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data; and

wherein said control unit comprises a write control unit for generating a write address to be used to write said data to be transmitted in said storing unit with said data to be transmitted arranged in a matrix and rearranged by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data, and for writing said data to be transmitted in said storing unit so as to be read said data from said storing unit according to the order of addresses of said storing unit.

**21. (previously amended)** The interleaving apparatus according to claim 19, wherein said read control unit comprises a column number generating unit for randomly generating column numbers and a row number generating unit for randomly generating row numbers, and said write control unit writes said data to be transmitted in said storing unit with numbers generated by said column number generating unit and said row number generating unit as said write address to write said data to be transmitted in said storing unit.

**22. (previously amended)** The interleaving apparatus according to claim 20, wherein said write control unit comprises a column number generating unit for randomly generating column numbers and a row number generating unit for randomly generating row numbers, and said write control unit writes said data to be transmitted in said storing unit with numbers generated by said column number generating unit and said row

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number generating unit as said write address to write said data to be transmitted in said storing unit.

**23. (previously amended)** An interleaving apparatus for interleaving data to be transmitted, comprising:

a storing unit for storing data to be transmitted;

a control unit for controlling said storing unit so that said data to be transmitted is outputted from said storing unit with said data to be transmitted arranged in a matrix and rearranged by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data; and

wherein said control unit writes said data to be transmitted in said storing unit according to the order of addresses of said storing unit, and said control unit comprises a read control unit for generating a read address to be used to read said data to be transmitted from said storing unit with said data to be transmitted stored in said storing unit arranged in a matrix and rearranged by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data, to read said data to be transmitted.

**24. (previously amended)** An interleaving apparatus for interleaving data to be transmitted, comprising:

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a storing unit for storing data to be transmitted;

a control unit for controlling said storing unit so that said data to be transmitted is outputted from said storing unit with said data to be transmitted arranged in a matrix and rearranged by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data; and

wherein said control unit comprises a read control unit for generating a read address to be used to read said data to be transmitted, written in the order of addresses of said storing unit, from said storing unit with said data to be transmitted stored in said storing unit arranged in a matrix and rearranged by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data, to read said data to be transmitted.

**25. (previously amended)** The interleaving apparatus according to claim 23, wherein said read control unit comprises a column number generating unit for randomly generating column numbers and a row number generating unit for randomly generating row numbers, and said read control unit reads said data to be transmitted from said storing unit with numbers generated by said column number generating unit and said row number generating unit as said read address.

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**26. (previously amended)** The interleaving apparatus according to claim 24, wherein said read control unit comprises a column number generating unit for randomly generating column numbers and a row number generating unit for randomly generating row numbers, and said read control unit reads said data to be transmitted from said storing unit with numbers generated by said column number generating unit and said row number generating unit as said read address.

**27. (previously added)** The interleaving apparatus according to claim 21, wherein each of said column number generating unit and said row number generating unit is configured with a memory for holding numbers used as addresses in a predetermined order.

**28. (previously added)** The interleaving apparatus according to claim 22, wherein each of said column number generating unit and said row number generating unit is configured with a memory for holding numbers used as addresses in a predetermined order.

**29. (previously added)** The interleaving apparatus according to claim 25, wherein each of said column number generating unit and said row number generating unit is configured with a memory for holding numbers used as addresses in a predetermined order.

**30. (previously added)** The interleaving apparatus according to claim 26, wherein each of said column number generating unit and said row number generating

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unit is configured with a memory for holding numbers used as addresses in a predetermined order.

**31. (previously amended)** A de-interleaving apparatus for de-interleaving received data, comprising:

a storing unit for storing said received data;

a control unit for controlling said storing unit so that said received data is outputted from said storing unit in a state before said received data was interleaved by arranging said received data in a matrix and rearranging said received data by interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and by interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data; and

wherein said control unit comprises a write control unit for generating a write address to be used to write said received data in said storing unit in a state before said received data was interleaved by arranging said received data in a matrix and rearranging said received data by interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and by interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data, to write said received data, and said control unit reads said received data stored in said storing unit according to the order of addresses of said storing unit.

**32. (previously amended)** A de-interleaving apparatus for de-interleaving

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received data, comprising:

a storing unit for storing said received data;

a control unit for controlling said storing unit so that said received data is outputted from said storing unit in a state before said received data was interleaved by arranging said received data in a matrix and rearranging said received data by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data; and

wherein said control unit comprises a write control unit for generating a write address to be used to write said data to be transmitted in said storing unit with said data to be transmitted arranged in a matrix and rearranged by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and by interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data, and for writing said data to be transmitted in said storing unit so as to be read said data from said storing unit according to the order of addresses of said storing unit.

**33. (previously amended)** The interleaving apparatus according to claim 31, wherein said write control unit comprises a column number generating unit for randomly generating column numbers and a row number generating unit for randomly generating row numbers, and said write control unit writes said data to be transmitted in said storing unit with numbers generated by said column number generating unit and said row

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number generating unit as said write address to write said data to be transmitted in said storing unit.

**34. (previously amended)** The interleaving apparatus according to claim 32, wherein said write control unit comprises a column number generating unit for randomly generating column numbers and a row number generating unit for randomly generating row numbers, and said write control unit writes said data to be transmitted in said storing unit with numbers generated by said column number generating unit and said row number generating unit as said write address to write said data to be transmitted in said storing unit.

**35. (previously amended)** A de-interleaving apparatus for de-interleaving received data, comprising:

a storing unit for storing said received data;

a control unit for controlling said storing unit so that said received data is outputted from said storing unit in a state before said received data was interleaved by arranging said received data in a matrix and rearranging said received data by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data; and

wherein said control unit writes said data to be transmitted in said storing unit according to the order of addresses of said storing unit, and said control unit comprises a read control unit for generating a read address to be used to read said data to be

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transmitted from said storing unit with said data to be transmitted stored in said storing unit arranged in a matrix and rearranged by interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and by interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data, to read said data to be transmitted.

**36. (previously amended)** A de-interleaving apparatus for de-interleaving received data, comprising:

a storing unit for storing said received data;

a control unit for controlling said storing unit so that said received data is outputted from said storing unit in a state before said received data was interleaved by arranging said received data in a matrix and rearranging said received data by interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and by interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data; and

wherein said control unit comprises a read control unit for generating a read address to be used to read said data to be transmitted, written in the order of addresses of said storing unit, from said storing unit with said data to be transmitted stored in said storing unit arranged in a matrix and rearranged by interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and by interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data, to read said data to be transmitted.



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**37. (previously amended)** The de-interleaving apparatus according to claim 35, wherein said read control unit comprises a column number generating unit for randomly generating column numbers and a row number generating unit for randomly generating row numbers, and said read control unit reads said received data from said storing unit with numbers generated by said column number generating unit and said row number generating unit as a read address.

**38. (previously amended)** The de-interleaving apparatus according to claim 36, wherein said read control unit comprises a column number generating unit for randomly generating column numbers and a row number generating unit for randomly generating row numbers, and said read control unit reads said received data from said storing unit with numbers generated by said column number generating unit and said row number generating unit as a read address.

**39. (previously added)** The de-interleaving apparatus according to claim 33, wherein each of said column number generating unit and said row number generating unit is configured with a memory for holding numbers used as addresses in a predetermined order.

**40. (previously added)** The de-interleaving apparatus according to claim 34, wherein each of said column number generating unit and said row number generating unit is configured with a memory for holding numbers used as addresses in a predetermined order.

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**41. (previously added)** The de-interleaving apparatus according to claim 37, wherein each of said column number generating unit and said row number generating unit is configured with a memory for holding numbers used as addresses in a predetermined order.

**42. (previously added)** The de-interleaving apparatus according to claim 38, wherein each of said column number generating unit and said row number generating unit is configured with a memory for holding numbers used as addresses in a predetermined order.

**43. (previously amended)** A transmitting apparatus with an interleaving function, comprising:

an error detection encoding unit for encoding an error detecting bit and for adding said error detecting bit to data to be transmitted;

an error correction encoding unit for adding an error correcting code, which is to be used for error correction, to said data to be transmitted, sent from said error detection encoding unit;

an interleaving unit which includes a storing unit for storing said data to be transmitted, from said error detection encoding unit, and a control unit for controlling said storing unit so that said data to be transmitted is outputted from said storing unit with said data to be transmitted arranged in a matrix and rearranged by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix

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according to a predetermined order, each column representing a set of data pieces of said data;

a signal assembling unit assembles interleaved data from said interleaving unit to form a signal format suited for transmission; and

a spreading unit for converting the signal sent from said signal assembling unit into a spread signal using a predetermined spreading code.

**44. (previously amended)** The transmitting apparatus with a interleaving function according to claim 43, wherein said control unit comprises a write control unit for generating a write address to be used to write said data to be transmitted in said storing unit with said data to be transmitted arranged in a matrix and rearranged by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data, and for writing said data to be transmitted in said storing unit, and said control unit reads said data to be transmitted stored in said storing unit according to the order of addresses of said storing unit.

**45. (previously amended)** The transmitting apparatus with a interleaving function according to claim 43, wherein said control unit writes said data to be transmitted in said storing unit according to the order of addresses of said storing unit, and said control unit comprises a read control unit for generating a read address to be used to read said data to be transmitted from said storing unit with said data to be transmitted stored in said storing unit arranged in a matrix and rearranged by at least one

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of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data, to read said data to be transmitted.

**46. (previously amended)** A receiving apparatus with a de-interleaving function, comprising:

- a de-spreading unit for separating a desired signal from a received signal using a de-spreading code;

- a data extracting unit for extracting received data from the signal separated by the de-spreading unit;

- a de-interleaving unit which includes a storing unit for storing said received data from said de-spreading unit, and a control unit for controlling said storing unit so that said received data is outputted from said storing unit in a state before said received data was interleaved by arranging said received data in a matrix and rearranging said received data by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data;

- an error correction decoding unit for decoding said received data de-interleaved by said de-interleaving unit, and for correcting an error included in said received data using an error correcting code; and

- an error detecting unit for detecting an error detecting bit added when said received data is transmitted on the basis of a bit structure of the error detecting bit

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previously set.

**47. (currently amended)** The receiving apparatus with a de-interleaving function according to claim 46, wherein said control unit comprises a write control unit for generating a write address to be used to write said received data in said storing unit in a state before said received data was interleaved by arranging said received data in a matrix and rearranging said received data by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and ~~interchanging~~ interchanging rows of the matrix according to a predetermined order, each column representing a set of data pieces of said data, to write said received data, and said control unit reads said received data stored in said storing unit according to the order of addresses of said storing unit.

**48. (currently amended)** The receiving apparatus with a de-interleaving function according to claim 46, wherein said control unit writes said data to be transmitted in said storing unit according to the order of addresses of said storing unit, and said control unit comprises a read control unit for generating a read address to be used to read said data to be transmitted from said storing unit with said data to be transmitted stored in said storing unit arranged in a matrix and rearranged by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data,} data, interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data, to read said data to be transmitted.

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**49. (previously amended)** A transmitting and receiving apparatus with a interleaving and de-interleaving function, comprising:

an error detection encoding unit for encoding an error detecting bit and for adding said error detecting bit to data to be transmitted;

an error correction encoding unit for adding an error correcting code, which is to be used for error correction, to said data to be transmitted, sent from said error detection encoding unit;

an interleaving unit which includes a storing unit for storing said data to be transmitted, from said error detection encoding unit, and a control unit for controlling said storing unit so that said data to be transmitted is outputted from said storing unit with said data to be transmitted arranged in a matrix and rearranged by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data;

a signal assembling unit assembles interleaved data from said interleaving unit to form a signal format suited for transmission;

a spreading unit for converting the signal sent from said signal assembling unit into a spread signal using a predetermined spreading code;

a duplexer for transmitting the spread signal from said spreading unit to an antenna;

a de-spreading unit for separating a desired signal from a received signal via said antenna and duplexer using a de-spreading code;

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a data extracting unit for extracting received data from the signal separated by the de-spreading unit;

a de-interleaving unit which includes a storing unit for storing said received data from said de-spreading unit, and a control unit for controlling said storing unit so that said received data is outputted from said storing unit in a state before said received data was interleaved by arranging said received data in a matrix and rearranging said received data by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data;

an error correction decoding unit for decoding said received data de-interleaved by said de-interleaving unit, and for correcting an error included in said received data using an error correcting code; and

an error detecting unit for detecting an error detecting bit added when said received data is transmitted on the basis of a bit structure of the error detecting bit previously set.

**50. (previously amended)** The transmitting and receiving apparatus according to claim 49, wherein said control unit comprises a write control unit for generating a write address to be used to write said data to be transmitted in said storing unit with said data to be transmitted arranged in a matrix and rearranged by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data, and for

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writing said data to be transmitted in said storing unit, and said control unit reads said data to be transmitted stored in said storing unit according to the order of addresses of said storing unit.

**51. (previously amended)** The transmitting and receiving apparatus according to claim 49, wherein said control unit writes said data to be transmitted in said storing unit according to the order of addresses of said storing unit, and said control unit comprises a read control unit for generating a read address to be used to read said data to be transmitted from said storing unit with said data to be transmitted stored in said storing unit arranged in a matrix and rearranged by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data, to read said data to be transmitted.

**52. (previously amended)** The transmitting and receiving apparatus according to claim 49, wherein said control unit comprises a write control unit for generating a write address to be used to write said received data in said storing unit in a state before said received data was interleaved by arranging said received data in a matrix and rearranging said received data by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data, to write said received data, and said control



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unit reads said received data stored in said storing unit according to the order of addresses of said storing unit.

**53. (previously amended)** The transmitting and receiving apparatus according to claim 49, wherein said control unit writes said data to be transmitted in said storing unit according to the order of addresses of said storing unit, and said control unit comprises a read control unit for generating a read address to be used to read said data to be transmitted from said storing unit with said data to be transmitted stored in said storing unit arranged in a matrix and rearranged by at least one of interchanging rows of the matrix according to a predetermined order, each row representing a set of data pieces of said data, and interchanging columns of the matrix according to a predetermined order, each column representing a set of data pieces of said data, to read said data to be transmitted.